ABSTRACT

A method of making sodium zirconium carbonate is described which involves forming a mixture of zirconium oxychloride with soda ash and then heating at a sufficient temperature and for a sufficient time to form the sodium zirconium carbonate. Subsequent washing and filtration steps can further form parts of this process. A novel sodium zirconium carbonate is further described which contains from about 2 wt% to about 5 wt% Na+; from about 44 wt% to about 50 wt% ZrO_2; from about 12 wt% to about 18 wt% CO_3^{2-}; and from about 32 wt% to about 35 wt% H_2O. Methods of making zirconium basic carbonate are further described which involve titrating an aqueous slurry of sodium zirconium carbonate to a pH of from about 3.5 to about 4.0 with an acidic agent wherein the sodium zirconium carbonate has a moisture content of from about 15% to about 25% LOD in solid form. The process further involves washing the aqueous slurry containing the formed zirconium basic carbonate with water. A novel zirconium basic carbonate is further disclosed which has a minimum adsorption capacity of from about 30 to about 35 mg/PO_4-P/gm SCZ; a minimum HCO_3- content of from about 2 to about 4 mEq HCO_3-gm/SCZ; a leachable Na^+ content of from about 1.5 to about 2.0 mEq Na^+/gm SCZ; and/or a pH range of titrated sodium zirconium carbonate of from about 6 to about 7. A method of making zirconium phosphate is also disclosed which involves treating sodium zirconium carbonate with caustic soda to from an alkaline hydrous zirconium oxide which is subsequently heated and mixed with phosphoric acid to obtain an acid zirconium phosphate which can be titrated with caustic soda to achieve the desired zirconium phosphate. Novel zirconium phosphates are also disclosed as well as uses for the above zirconium containing materials.